

EFFECTS OF BIOACCUMULATION ON ECOSYSTEMS

Human activity creates many harmful pollutants. These build up in the environment when decomposers are unable to break them down. Plants take up these pollutants. The pollutants are then transferred along the food chain until they reach the highest trophic level.

BIOACCUMULATION refers to the gradual build-up of pollutants in living organisms.

BIOMAGNIFICATION refers to the process in which pollutants not only accumulate, but also become more concentrated at each trophic level. Organisms at lower trophic levels may be affected by the pollutant, but primary, secondary, and tertiary consumers will be more affected, because levels will build up in their tissues as they consume contaminated food.

An example of biomagnification is the PCB concentrations in the orca's food web. When orcas consume food contaminated with PCBs, they store some of the PCBs in their blubber. When salmon (their primary food) is not available, orcas use their blubber for energy. This releases PCBs into their system.

Pollutants can build up to toxic levels in organisms at the top of the food chain. They can also affect entire ecosystems when **KEYSTONE SPECIES**, species that greatly affect ecosystem health, or the reproductive abilities of species, are harmed.

PCBs (polychlorinated biphenyls) were once widely used in industrial products but are now banned in North America. They interfere with normal functioning of the body's immune system and cause problems with reproduction.

PCBs have a long half-life (time it takes for the amount of a substance to decrease by half). They stay in the environment for a long time. Aquatic ecosystems are most sensitive to PCBs. Organisms at high trophic levels, like the orca, retain high levels of the pollutant.

POPs (persistent organic pollutants) are harmful, carbon-containing compounds that remain in water and soil for many years.

DDT (dichloro-diphenyl-trichloroethane) is a toxic POP that was used as a pesticide in the past to control disease-carrying mosquitoes. Accumulation is measured in parts per million (ppm). This refers to one particle of a given substance mixed with 999 999 other particles. DDT is harmful at 5 ppm.

Complete Checking Concepts Questions #1-20 on page 103

Use the following chart to complete question #16.

	Lead	Cadmium	Mercury
Natural Sources			
Human-Made Sources			
Effects on Plants and Animals			
Effects on Humans			